2006 National Fire Control Symposium

2006

Joint Fire Control: No Sanctuary for the Adversary

24-27 July, 2006
Tucson, AZ

Invitation

Please visit our website at http://www.usasymposium.com/nfcs for additional information.

You are Invited

Please join us for our 15th year

We are pleased to invite you to the 15th annual National Fire Control Symposium. This event focuses on current warfighter issues and challenges applicable for all military services and the defense industry. This year's theme, "Joint Fire Control: No Sanctuary for the Adversary," captures the increased challenges faced by our forces as they strive for timely and accurate target elimination in spite of their increasingly mobile and elusive nature. The Symposium addresses the application and integration of sensing, information interoperability, and weapons used for attacking difficult targets characterized as concealed, time-critical, urban, deeply buried, or electronic. Conducted in a classified environment, the NFCS is a dynamic forum for presentation, discussion, and sharing of ideas required for: force management and pre-mission planning; locating, identifying, targeting, and attacking air/sea/ground targets; and performing post-attack evaluations.

The conference will be held on 24-27 July, 2006 in Tucson, Arizona at the Westin La Paloma Resort & Spa and at Raytheon Missile Systems. You can stay abreast of any updates to the program by visiting our website at www.usasymposium.com/nfcs.

Agenda at a Glance

Sunday, 23 July 2006
1500 - 2000	Registration (Westin)
	** Highly Encouraged**

Monday, 24 July 2006
0600 - 1700	Registration (Westin)
0700	Busses Depart for Raytheon
0800 - 1130	Tutorials (Raytheon)
1130	Buses depart for Westin
1200 - 1330	Lunch & Exhibit Kick-off (Westin)
1330 - 1700	Tutorials (Westin)
1700 - 1830	Welcome Reception (Westin)

Tuesday, 25 July 2006
0700 - 1700	Registration (Westin)
0800 - 1200	Plenary Session (Westin)
1200 - 1330	Lunch (Westin)
1330 - 1700	Advanced Technologies for Fire Control Session (Westin)
1700 - 1830	Reception (Westin)

Wednesday, 26 July 2006
0600 - 1700	Registration (Westin)
0700	Busses Depart for Raytheon
0800 - 1200	Combat Identification Session (Raytheon)
1200 - 1300	Lunch (Raytheon)
1300 - 1700	Joint Air and Missile Defense Session (Raytheon)

Thursday, 27 July 2006
0600 - 1300	Registration (Westin)
0700	Busses Depart for Raytheon
0800 - 1200	Network Enhanced Fire Control Session (Raytheon)
1200 - 1300	Lunch
1300 - 1700	Time Sensitive Targeting and Fire Control in Difficult Environments Session (Raytheon)

Contact Information

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Plenary Session

Tuesday, 25 July 2006

This year's Plenary Session features an excellent array of key decision makers presenting their views on the issues and activities affecting our Nation's fire control community. Please join us for all of these distinguished presentations.

Welcome: Mr. Harry Schulte

VP Strike Product Line, Raytheon Missile Systems

Moderator: Colonel Gary Hopper

Deputy Director, Air Force Research Laboratory, Sensors Directorate

Special Guest Presentation: Senator John McCain (Invited)

Senior Senator from Arizona

Keynote: General John Jumper (Invited)

Retired Chief of Staff, United States Air Force

Air Force Perspective: Mr. Les McFawn (Invited)

Executive Director, Air Force Research Laboratory

Navy Perspective: Mr. Rueben Pitts

Major Program Manager, Integrated Combat Systems, PEO IWS

Army Perspective: Colonel (P) Roger Mathews (Invited)

Deputy Commander for Operations, U.S. Army Space and Missile Defense Command

Symposium Hotel

The Westin La Paloma Resort & Spa
3800 East Sunrise Drive, Tucson, AZ 85718-3302
Fax: 520-577-5878
Reservations: 800-937-8461
Group Block Name: National Fire Control Symposium
Group Rate: Prevailing Per Diem (Currently $76 plus tax)

> **Grand Prize Giveaway**
>
> A grand prize will be given away Thursday afternoon at the close of the symposium. To qualify for the drawing, tickets will be handed out for attendance at the end of each session and for turning in your Symposium evaluation form. You must be present to win.

Pre-Registration

Bypass the crowd and save money by pre-registering. For the reduced rates, registration must be postmarked by 3 July 2006 and payment must accompany your registration. On-site registration will only be located at the Westin. Please note, you must have your NFCS badge to be admitted into the Symposium at Raytheon - no exceptions. Badges can be picked up at the registration desk at The Westin.

$595 - Full Access Registration by 3 July 2006
$695 - Full Access Registration after 3 July 2006
$325 - Exhibit area Only Registration by 3 July 2006
$425 - Exhibit area Only Registration after 3 July 2006

Payment, Cancellations, Refunds

Payment must be received with your registration by the cut-off dates listed above for those rates to be honored. Payment forms include check, money order, purchase order, MasterCard, Visa, and American Express. All checks must be drawn on U.S. funds. Make checks payable to Anteon Corporation. No refunds for cancellation will be granted after 3 July 2006. Substitutions will be accepted. Cancellations prior to 3 July 2006 will result in a refund of paid fees minus a $75 processing fee.

Transportation

There is limited parking available at Raytheon. Passes will be given out on a first-come-first-served basis to the first 150 who request them. We encourage you to car pool to Raytheon to help with the congestion. Bussing will be provided for all others. Please keep in mind that the commute, during certain times of the day, can take 45 minutes. With this in mind, and due to tight security at Raytheon, please be sure to leave enough time to arrive and get settled in before the 0800 start time.

Attendee's are encouraged to pick up their badges on Sunday to avoid missing the transportation provided to Raytheon on Monday. Busses will leave the Westin at 0700 *sharp* each morning. On Monday, busses will return to the Westin for lunch at 1130. On Wednesday and Thursday, one round trip will also be provided mid-afternoon. Busses will depart Raytheon and will return to the Westin at the close of the symposium on Wednesday and Thursday.

Tours

Raytheon welcomes you to Tucson, AZ for the National Fire and Control Symposium. A tour of the Raytheon Missile Systems facility will be conducted on Friday, July, 28 2006 (the time will be posted on the website). The facility tour will feature an overview of our Navy Weapon Systems Common Production factory, Simulation and Wargaming Laboratory, and a demonstration of a future Army concept development program. Tour size is limited to first 75 people that sign up.

Sponsorship

A big thanks goes out to our sponsors Anteon Corporation and Raytheon! If you are looking for opportunities to enhance your marketing, this symposium offers many sponsorship opportunities that provide great visibility. Please contact Michelle Williams at 937-476-2165 for information on becoming a sponsor.

Symposium Attire

Business casual, summer uniform, or flight suit.

Please visit our website at http://www.usasymposium.com/nfcs for additional information.

Exhibit Information

The 2006 National Fire Control will showcase state-of-the-art capabilities, successes, and programs in precision targeting and will focus on the government's and industry's contribution to current warfighter issues and challenges as they relate to "Joint Fire Control: No Sanctuary for the Adversary". We have a great event planned this year and would like you and your organization to participate. Here are some reasons why:

- NFCS is the only tri-service supported symposium concentrated on combat fire control in a classified environment,
- The Symposium brings together members of acquisition [including research and development, and science and technology], operations, and intelligence – the decision makers, researchers, developers, implementers, and users,
- NFCS is the premier conference for real-world fire control topics for the warfighter and engineer, and attracts the decision makers in this arena,
- Spin-offs and collaboration happen.

> **WHY NFCS**
> *"IT CLEARLY HIGHLIGHTS THE TREMENDOUS INFORMATION BEING COLLECTED ACROSS DOD & INDUSTRY, ETC. NOW THE ISSUES ARE TO TURN THIS INFO INTO USABLE KNOWLEDGE." - AFRL*

Exhibit Fees
Cost: $850 per 10x10
Payment is required to reserve your space

Exhibit fees include:
- Four Set-up and tear-down access badges
- One complimentary full registration or one complimentary exhibit area only registration
- Organization listing on website
- Three to four sentence ad on the NFCS website
- Web link from NFCS conference website to yours
- Listing in the program (If application is received prior to the program being published)
- Listing in the proceedings
- Exhibit service manual
- Post registration list (PDF Format)
- Organization listed on promotional signage at Symposium
- Attendee lunches and receptions in the exhibit hall
- Standard pipe and drape
- Draped 6 ft table
- Two chairs
- Wastebasket

Exhibit Hall Classification
The exhibit hall will be unclassified. However, if you plan to exhibit FOUO materials, your exhibit will receive special protection consideration.

> **WHY NFCS**
> *"I'VE GOTTEN A MUCH BROADER EXPOSURE TO WHAT'S HAPPENING ACROSS THE DOD. MOREOVER, IT HAS ONLY BEEN THROUGH THE NFCS THAT I HAVE BEEN EXPOSED TO THE WARFIGHTER PERSPECTIVE: SOMETHING THAT I WOULD NOT HAVE BENEFITED FROM OTHERWISE." - MIT*

Exhibit Set-up and Dismantle
We have built approximately 14 hours of face time into the program with attendees. Preliminary set-up and dismantle times are:
Set-up: Monday, 24 July, 0900 - 1130
Tear-down: Wednesday, 26 July, 0800 - 1200

Please visit our website at http://www.usasymposium.com/nfcs for additional information.

Security

Visit Requests

Attendees must submit a visit request to attend the Symposium. A copy of your visit request must be received by COB 7 July 2006. Visit requests must be submitted in advance of this event. You may use your own organizational/company visit request form, or use the security form in this package. Send your visit request to Anteon Corporation, Attn: Ms. Sherry Johnson, 5100 Springfield Pike, Suite 509, Dayton, OH 45431. You may also fax your visit request to (937) 253-2296.

Admission into the Symposium

To be admitted into the Symposium, you must be a U.S. citizen, have a final secret clearance or higher, and have a 2006 NFCS Photo Badge. Badges will be given out once you have shown you meet the security guidelines and have shown one of the following photo identifications:

- Driver's License
- Passport
- Current Government/Military ID

NFCS photo badges are required for admittance into the Symposium general session and exhibit areas. Badges are free if photos are sent in by 3 July, 2006. After that date a fee of $10 will be collected. Send digitized photos to srjohnson@anteon.com in JPEG format at 150 dpi or above.

Admission onto the Raytheon Property

If you plan to drive your own car or carpool to Raytheon, you must have three things: a NFCS issued car pass on the dash (driver's side), your NFCS badge, and a valid driver's license. All passengers in the car must have an NFCS badge and a photo ID from the list above. If you are riding the NFCS bus, you must has an NFCS badge and a photo ID from the list above.

Electronic Devices

No electronic devices will be allowed in the general session. This includes, but is not limited to, incoming and outgoing pagers or beepers, cell phones, Palm Pilots, Blackberries, audio/visual recording devices, and photographic equipment. Briefcases and planners are also prohibited. Purses will be subject to a search before admittance into the Symposium auditorium.

Notetaking

Notetaking is prohibited except in the NFCS notebooks that will be provided at the entrance to the auditorium. The notebooks will be coded with an identification number that matches an identification number on your badge. When leaving the auditorium, you must turn the notebook back in to the security staff. All notebooks will be shipped to attendees (with classified mailing addresses) at the close of the Symposium.

Please visit our website at http://www.usasymposium.com/nfcs for additional information.

Tutorials

Chairs: Mr. Neeraj Pujara, AFRL/SN and Mr. Bob Strider, USASMDC

The 2006 National Fire Control Symposium is offering an outstanding array of tutorials for attendee's. This year's offerings will provide an in-depth look at six different high interest areas that are critical research areas in the fire control community. Each tutorial will provide an overview of current capabilities, research currently being conducted, and will identify important and promising research areas for the future. This year's format will provide ample opportunity for interaction with scientists and engineers working at the forefront of these technologies. We hope you will take advantage of this opportunity.

Advanced Missile Technologies and Systems
Presenter: TBA, Raytheon Missile Systems

This tutorial will describe advanced missile technologies and how they will enhance the fire control loop. Technology advances in missile system hardware, software, and mission level integration concepts offer the potential to significantly improve the effectiveness of future weapons systems. This tutorial will examine a variety of these advanced technologies and describe how they will be applied in next generation weapons systems.

Advanced Imaging Technologies
Presenter: TBA, Lockheed Martin

Hyperspectral and multispectral technologies offer the warfighter opportunities to see, discriminate, and prosecute with increased reliability. This tutorial will describe both the differences between hyper and multispectral and provide a sampling of possible applications, current sensor system possibilities and impacts to automatic target recognition algorithms.

Emerging Radar Technologies
Presenter: TBA, Northrop Grumman Electronic Systems

This 60-minute, SECRET-level tutorial will look at some of the more significant recent advances in the development of various technologies used in either airborne or ground-based radars. It will span not only hardware improvements but also recent software and algorithm advances. Although the exact outline for this tutorial is not yet finalized, it is envisioned to be drawn from such diverse areas as:

Hardware
- Active Electronically-Scanned Array (AESA) radar technology (used on F-22A, F-15C, F-35, & F/A-18E/F)
- Transmit/Receive (T/R} module architecture approaches
- Recent DARPA hardware development program advances (Technology for Frequency Agile Digitally Synthesized Transmitters, Technology for Efficient, Agile Mixed Signal Microsystems, and Intelligent RF Front Ends)

Algorithms
- Synthetic Aperture Radar (SAR), Ground Moving Target Indicator (GMTI), and Airborne Moving Target Indicator (AMTI) modes
- Wideband Space-time Adaptive Processing (STAP)
- Feature-Aided Tracking (FAT)
- Knowledge-Aided Sensor Signal Processing and Expert Reasoning (KASSPER)

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Free-space Lasercom
Presenter: Dr. Frederick Walther, MIT Lincoln Laboratory

Fiber-optic lasercom systems currently form the technology base for high speed telecom networks operating throughout the world. During the past 15 years, lasercom systems developers have leveraged developments in the fiber-optic domain to mature and demonstrate free-space lasercom technology to the point where it can be fielded.   Lasercom systems are now under development for planned insertion into military communications networks over the next decade. This tutorial will provide an introduction to lasercom systems and techniques, illustrating the significant advantages such systems can provide to the user. Fundamentals of free-space lasercom, simple terminal design, and the enabling technologies that support such systems will be discussed in sufficient detail to provide a basic understanding of lasercom systems and their applicability to military communications systems.

GPS 101
Presenter: Dr. Mikel Miller, AFRL/SN

This course presents the fundamentals of the GPS system and it is intended for people with a technical background who do not have significant GPS experience. Topics covered include time-of-arrival positioning, overall system design of GPS, signal structure, error characterization, dilution of precision (DOP), differential GPS, and GPS modernization.

Transformational SATCOM (Tentative)
Presenter: Colonel Jay Moody (USAF), TSAT Program Director, MILSATCOM Joint Program Office

TSAT will provide unprecedented satellite communications with internet-like capability which will extend the DoD Global Information Grid (GIG) to deployed users worldwide and deliver an order of magnitude increase in capacity. TSAT will provide increased connectivity for protected communications (low probability of detection, low probability of intercept, and jam resistance) to users "on the move" with small antennas. TSAT will also enable real-time and persistent worldwide connectivity to Air and Space Intelligence, Surveillance and Reconnaissance (AISR / SISR) assets; providing increased situational awareness and targeting information to the warfighter. TSAT will provide a significant increase in data rates over all existing wideband and protected MILSATCOM systems. These advances come from the incorporation of new technologies such as advanced laser communications, RF waveforms and internet-like packet switching.

TSAT, through its constellation of 5 satellites, will deliver improvements in connectivity, capacity, interoperability, availability, security, and speed. TSAT's total worldwide capacity will be 28.5 Gbps and will support a broad range of users across ground, air, and space. For example, a ground mobile TSAT user can connect at 1.5 Mega-bits-per-second (T-1 equivalent) using a one-foot antenna. Where feasible, the burden is placed on the satellite to allow users to connect at high rates with smaller antennas. The network aspects of TSAT are managed through the TSAT Mission Operations System (TMOS). TMOS includes both the operations management element that provides the long-term policy and operational planning functions for the TSAT system, as well as other legacy MILSATCOM systems. These systems include AEHF and the network operations element that provides real-time management of the operation and configuration of the TSAT network; similar to a typical terrestrial network operations center, but with the addition of satellite network resource management functions. TMOS also provides the terrestrial TSAT interfaces to the Global Information Grid.

Advanced Technologies for Fire Control Session

Chairs: Mr. Doug Ousborne, JHU APL; Mr. Bryant Centofanti, Northrop Grumman; and Mr. James Moore, AFRL/MN

Just as today's sophisticated weapon systems were yesterday's advanced technologies, emerging concepts and technologies will be part of the warfighters' future arsenal and fire control capabilities. These are the seed-corn for advanced fire control technologies, giving tomorrow's military forces an overwhelming advantage in future conflicts. This session will focus on new and emerging technologies (both offensive and defensive) and key initiatives that will help maintain the U.S. warfighters' edge against an increasingly sophisticated enemy within unconventional military environments. This session will cover concepts including non-lethal antipersonnel weapons, technologies such as rail guns and directed energy weapons, emerging weapons and weapon system platforms, and their impact on the fire control requirements (detection range, track accuracy, update rates, track identification accuracy, etc.) for various missions and threats. It will also include human factors considerations, decision aids, navigation aids, and data links. This session will also include new and novel algorithms, devices, and compelling new techniques that hold great promise for improved military effectiveness. Presentations include:

- ⊕ "Advanced Reference Systems for Fire Control," Neeraj Pujara, AFRL/SN
- ⊕ "Precision Delivery of Common Smart Submunitions with Area Dominance Munitions," Benjamin Plenge, AFRL/MN
- ⊕ "Powered Low Cost Autonomous Attack System: A Network-Centric Wide Area Search Munition," James Savage, AFRL/MN
- ⊕ "Multi-Sensor GOTCHA Tracking of Dismounts and Suspected VBIEDs," Rob Williams, AFRL/SN
- ⊕ "Airborne Electronic Attack (AEA) Program," James Catanzarite, General Dynamics - SRS
- ⊕ "Navy Support for Long Range Remote Engagements in the Joint Theater," Thomas Shew, Raytheon Missile Systems
- ⊕ "Marine Corps Fires Mission Profiling Through Experimentation with Real and Simulated Systems," Piali De, Raytheon
- ⊕ "NATO Sharable Fire Control Software," James Matts, US Army ARDEC

Chairs: Mr. Bob Hintz, NAVAIR WD; Mr. Jay Hodge, NAVAIR WD; Mr. Larry McLeod, HQ USAF/XORC; and Mr. Norven Goddard, USASMDC

Improvement of combat identification is a major objective of all the services because of missed fleeting target opportunities and the ever present threat of fratricide, especially in the complicated urban environments of today's and future battlefields. Combat ID is a critical part of the Fire Control loop that can assure that friendlies and neutrals are not engaged by modern weapon systems. This session will address all of the potential combat ID interactions (air to surface, air to air, surface to air, and surface to surface), and consider both cooperative and non-cooperative approaches to achieving this capability. This session will attempt to present a balanced overview of current capabilities, and describe developmental efforts which can lead to the desired combat ID performance in the future. Cooperative Combat ID (CCID) systems (e.g. MK XII, Blue Force Tracking, BTIDS) continue to be improved, but are only able to address suitably equipped neutrals. Non-cooperative Combat ID (NCID) currently relies on the use of unique target markings (e.g. Florescent and thermal panels on armored vehicles), but in the future it will be based on advanced sensor suites and Automatic Target Recognition (ATR) technology that can address neutrals mixed with combatants. This session will present an overview of this area from a Fire Control perspective. Presentations include:

- ⊕ "Air-to-Ground Radar Imaging Moving Target Recognition and Identification (AGRI II): Goals and Challenges," Al Ezekiel, Raytheon
- ⊕ "LADAR: Emerging Fire Control Sensor Technology," Bruno Evans, Lockheed Martin Missiles & Fire Control
- ⊕ "Moving Target Combat ID Using Radar," Thomas Donohue, AFRL/SN
- ⊕ "NATO Non-Cooperative LADAR Combat ID for Urban Environments," Robert Hintz, NAVAIR WD
- ⊕ "Radar Vision," John McGrann, Northrop Grumman Electronic Systems
- ⊕ "MASINT Using Acoustic Signatures," Howard Sabrin, Atlantic Coast Technologies, Inc.
- ⊕ "Radio Based Combat Identification and Network Assisted Fire Control," John Wentworth, ITT
- ⊕ "Ground Track Fusion and Blue Force Tracking," Jeffrey Barton, JHU APL
- ⊕ Alternate: "Advanced Target Identification Techniques for Multi-hypothesis Tracking," Yang Chen, HRL Laboratories, LLC.

Joint Air and Missile Defense Session

Chairs: Mrs. Gisele Wilson, USASMDC; Mr. Stan Schroeder, Lockheed Martin; and Mr. Dan Misch, NSWCDD

Since WW II, the air and missile defense mission has pioneered many operational and technological advancements. That trend continues today at an accelerating pace with the need for Joint, Interagency, and Multi-National (JIM) interoperability responses to the cruise missile and ballistic missile threat and homeland defense. This session will address current key topics in Joint Air and Missile Defense including: evolving JIM architectures; the role of air and missile defense in asymmetric warfare; multisource integration and track management, classification, discrimination and identification; integration of planning, resource management and mission execution; integrated fire control; and automated battle management aids. Issues and solutions associated with the definition of requirements for, and the assessment and monitoring of performance in non-homogeneous, dynamic air and missile defense systems will be presented. Presentations include:

- ⊕ "Common Threat Evaluation - Automating Force-wide Threat Designation and Prioritization," Kenneth Shafer, JHU APL
- ⊕ "E-10A Program Overview/Cruise Missile Defense Capability," Robert Hasling, Northrop Grumman
- ⊕ "Distributive Collaborative Planning (DCP) System," Michael Leech, USASMDC Battle Lab
- ⊕ "Distributed Sensor and Weapons Resource Manager in a JBI Environment," Steven Cummings, Raytheon IDS
- ⊕ "Impacts and Changes in Integrated Fire Control Imposed by ROE for CONUS Cruise Missile Defense," Walt Cruse, USA RDECOM
- ⊕ "Short Range Anti-ship Cruise Missile Effects on the Aegis Combat System," Jeffrey Mitchell, JHU APL
- ⊕ "A Conceptual Architecture for Naval Effects Based Operations," Adam Simonoff, NSWCDD
- ⊕ "Cruiser Modernization: AAW Probability of Successful Engagement Establishment," David Zotian, JHU APL
- ⊕ Alternate: "US Army Air Defense Artillery Air and Missile Defense (AMD) Battalion Fire Coordination Center (FCC) Initiative," John Robinson, USASMDC
- ⊕ Alternate: "A Coordinated, Multi-ship Planning Concept for Ballistic Missile Defense," David Gavelek, Lockheed Martin

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Network Enhanced Fire Control Session

Chairs: Dr. Steve Davidson, MIT Lincoln Laboratory; Mr. Gary McCown, SPAWAR Systems Center SD; and Mr. Charles Kroelinger, US Army AMRDEC

Interoperability... Network-Centric... Information to the Tactical Edge... Fully Integrated Kill Chain... These are more than just buzzwords; they're an approach and means to realizing the full potential of otherwise stand-alone systems: Network Enhanced Fire Control. Organic weapon systems are effective, but when integrated with other sensors and weapons, they become even more effective. But leveraging network integration (breaking down stovepipes) is not easy. More than a decade after JTIDS/Link-16 became the US DoD standard, it is not even close to being fully utilized and its limitations hamper its utility for fire control. For aircraft, UHF voice remains the only fully-deployed, universal "network." And although our next-generation fighters have datalink capabilities, mixed-platform digital integration is still years away. In order to enhance weapon systems' effectiveness, we should be networking the way we fight: not based on who's got what terminal or radio, but instead based on the way aircraft, weapons systems, and personnel are deployed.

This session will focus on the "what" and "how" of Network Enhanced Fire Control: what it means to be netted, how to achieve interoperability, how to get information to the tactical edge, and how to provide situational awareness. We will examine the networks (e.g., data exchange, forwarding, linkages), their constituent communications systems (e.g., terrestrial, air-to-air, and satellite), and the benefit these provide—and will provide—to the warfighter. We will examine how networks improve combat effectiveness. Whether it is defending troops from attacking aircraft, attacking enemy infrastructure, protecting a fleet from a barrage of cruise missiles, or protecting the homeland from cruise and ballistic missiles, the objective is the same; putting the right weapon on the right target, with minimal waste and misses.

- "Network Centric Data Distribution (NCD2) Manager for Enhanced Fire Control," Lee Smith, Raytheon
- "Integrating Systems Architectures to Enhance Ballistic Missile Defense Fire Control," Christopher Runge and Jim Sierchio, Raytheon
- "Marine Air Ground Task Force (MAGTF) Command and Control (C2)," Thomas Irwin, Marine Corps Systems Command
- "Non-Traditional ISR/Non-Traditional Communications (NT-ISR/C) Operational Benefits Assessment," Frederick Reimer, Raytheon
- "The Airborne Network Definition Project: A Network Architecture Effort for Future Battlefield Networks that Enable Network-centric Warfare," Bishwaroop Ganguly, MIT Lincoln Laboratory
- "Early Operator Experimentation: Working with Tomorrow's Communication Systems Today," Jeff McLamb, MIT Lincoln Laboratory
- "Network Discovery Schemes Using Directional Antennas," Thomas Heffner, JHU APL
- "Tactics, Techniques, and Procedures for Simulating and Analyzing Net-centric Warfare Concepts - Representing Airspace Management," Timothy McKelvy, USA AMRDEC
- Alternate: "Accelerating the Kill Chain with Net-centric Global Track Management," Richard Neese, Raytheon
- Alternate: "Joint Interoperability: Providing Interoperable Joint Forces to the Joint Forces Commander," Louis Durkac, USAF

Time Sensitive Targeting and Fire Control in Difficult Environments Session

Chairs: Mr. Kip Turner, AFRL/SN; Mr. Russ Neu, Boeing; and Mr. Carlos Casteleiro, Lockheed Martin Missiles & Fire Control

The warfighter depends on advanced fire control systems to deliver weapons against our adversaries' targets with precision and timeliness. Difficult battlefield and environmental conditions can seriously challenge and compromise fire control capabilities. Relatively small mobile time-sensitive-targets employ mobility along with camouflage, concealment, and deception to defeat or hide from fire control systems. Urban environments characterized by reduced line-of-sight and reduced access for fire control platforms, and littoral waters characterized by heavy surface traffic have substantially greater collateral damage, target obscuration, clutter, and platform risk than the more benign rural and blue-water environments. Traditional combatants in urban environments and littoral waters are difficult, but asymmetric threats further complicate essential missions such as Suppression/Destruction of Enemy Air Defenses, Anti Surface Warfare, and Ship Self Defense due to their ambiguous hostile intent. The fire control problem is further exacerbated by adverse weather conditions and extreme ground/surface conditions. This session seeks papers addressing technological and systemic solutions leading to accurate air-to-ground, air-to-surface, surface-to-surface, and ground-to-ground fire control under these adverse conditions.

- "Airborne Targeting System Application in the Urban CAS Mission," Mark Sammons, Lockheed Martin Missiles & Fire Control
- "Distributed Imaging Radar Technology," Mike Smith, Radiance Technologies
- "Long-term Tracking and Precision Engagement of Ground Moving Targets Using Joint STARS," Richard Mercadante, Northrop Grumman
- "TST Detection and Engagement Prototype," James Cochran, JHU APL
- "Networked Effects to Defeat Air and Missile Threats in FCS Brigade Combat Team (BCT) Operations," Tim Puckett, Raytheon
- "Joint Approach for Target Management in a Net-centric Environment," Sean Beary, Raytheon
- "The Boeing Precision Image Registration Program," Andrew Oldroyd, Boeing
- "Mortar Fire Control System," Thomas Peters, US Army AMRDEC
- Alternate: "Coalition Naval Fires Interface Development and Demonstration," Michelle Adams, Naval Surface Warfare Center

Poster Presentations

Combat Identification Session

- "Advanced Target Identification Techniques for Multi-hypothesis Tracking," Yang Chen, HRL Laboratories, LLC.
- "Anti-terrorism Technology Demonstration," Ken Campbell, SPAWAR Systems Center
- "BDA Indicia," Lynn Boyer, Boeing
- "Future Combat Identification - A Key Enabler of Effective Joint Fire Control," Bonnie Young, Northrop Grumman
- "Radar Combat ID Algorithm Test-bed," Thomas Donohue, AFRL/SN

Network Enhanced Fire Control Session

- "Accelerating the Kill Chain with Net-centric Global Track Management," Richard Neese, Raytheon
- "Architectural Approaches for Achieving Interoperability in a Track Management System," Richard Neese, Raytheon
- "Early Operator Experimentation: Working with Tomorrow's Communication Systems Today," Jeff McLamb, MIT Lincoln Laboratory
- "Evaluating Network Reliability Improvements," David Kassay, MIT Lincoln Laboratory
- "Force Level Resource Aggregation," Mark Schmid, JHU APL
- "Information Exchange Requirements for Effective Distributed Weapons Coordination," Christopher Foley, JHU APL
- "Integrated Fire Control - The System Engineering Pyramid," James Keener, NSWCDD
- "Joint Interoperability: Providing Interoperable Joint Forces to the Joint Forces Commander," Louis Durkac, USAF
- "Maritime Domain Awareness: The Key to Maritime Security Operational Challenges and Technical Solutions," George Galdorisi, SPAWAR Systems Center
- "MATREX Blue Thread - Networked Effects C2 (NEC2)," Timothy McKelvy, USA AMRDEC
- "Network Survivability Analysis," Richard Talbott, JHU APL
- "Network-centric Electronic Warfare Architecture Analysis," Richard Poisel, Raytheon Missile Systems
- "Systems Engineering & Test for Non-systems," Tim Payment, Westar Aerospace & Defense Group

Time Sensitive Targeting and Fire Control in Difficult Environments Session

- "Airspace Management of Fires in the FBCT," Karen Saunders, PM FCS (BCT) UA
- "Army Single Integrated Space Picture (SISP)," Ronald Smith, USASMDC
- "Coalition Naval Fires Interface Development and Demonstration," Michelle Adams, NSWC
- "HQ-9 Surface-to-Air Missile System," Carl Mullins, Missile & Space Intelligence Center
- "Reducing Time Sensitive Target (TST) Prosecution Decision Time Using Inference Processing and Intelligent Agents," Willard Ratliff, Lockheed Martin ATL
- "Space Radar Contributions to Long Range Strike," David Devore, Northrup Grumman

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Joint Air and Missile Defense Session

⊕ "A Coordinated, Multi-ship Planning Concept for Ballistic Missile Defense," David Gavelek, Lockheed Martin MS2

⊕ "An Overview of Drivers for the Assessment of "AND" Capability: Simultaneous Sea Based Terminal "AND" Anti Air Warfare Missions by the Aegis Weapon System," Ravi Moorthy, Lockheed Martin

⊕ "An Overview of Methodology for the Assessment of Radar Resource Usage in Multi Mission Environments," Ravi Moorthy, Lockheed Martin

⊕ "On Mean and Covariance Propagation for BMD," Demetrios Serakos, NAVSEA

⊕ "Radar Doctrine Computational Requirements for the AEGIS BMD 3.6 Mission Planner," Bernard Ulfers, NSWC

⊕ "Successful Transition of Distributed Weapons Coordination Program Will Ensure Our Adversaries Find No Sanctuary in Numbers," P. Michael Guba, DMG Associates

⊕ "Thinking Outside the ABMA," Michael Burke, JHU APL

⊕ "US Army Air Defense Artillery Air and Missile Defense (AMD) Battalion Fire Coordination Center (FCC) Initiative," John Robinson, USASMDC

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